

White Paper Report

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HD5084909 White Paper

Digital Humanities Start Up Grant
METADATA GAMES
An Open Source Electronic Game for Archival Data Systems

Project director: Mary Flanagan

Grantee institution: Dartmouth College

Report on 12th May 2011

Introduction

Dartmouth's Level II startup project created a working example of an open source Metadata Games system at the Rauner Library and Archive, Dartmouth College.

Metadata Games represents an approach to crowd-sourcing that seeks a fun and social way to do important work. The Metadata Games team goal is to develop software to help people tag images with words – keywords—and add these to images as descriptive tags, or metadata. The goal of the research is to learn more about how people tag images and how to improve the quality of tags on images through games.

Participants play a game among a suite of games and gain points while contributing new metadata tags to archival images, or verifying what others have already added to the system.

We are an open source initiative aimed at helping libraries, archives, and other cultural institutions use different kinds of games to bolster their archival collections through active participation from people around the world. Soon, cultural institutions will be able to download our installation kit and try the system for themselves.

Press

The project has attracted national news. See these articles and videos:

Howard, Jennifer. "Gaming the Archives," *The Chronicle of Higher Education*. 23 May 2011. Available at: <http://chronicle.com/blogs/wiredcampus/gaming-the-archives/31435>

Mattera, Alexis. "Dartmouth's New Metadata Game Makes Tagging Archives Fun." *Scholarships.com*. 24 May 2011. <http://www.scholarships.com/Blog/college-news/dartmouths-new-metadata-game-makes-tagging-archives-fun/2642/>

Sullivan, Adam. "Can Videogames Help Kids?" (Metadata games) *WCAX.com* (Print and Video) 29 Sept. 2009. <http://www.wcax.com/Global/story.asp?S=11226683>

Presentations

"Gaming as Gateway to Computing for Girls and Women" NCWIT Summit on Women and IT: Practices & ideas to revolutionize computing, May 23-25 2011. New York, NY

"Metadata Games for Archives and Libraries," American Council of Learned Societies, Washington DC May 2011.

"Developing and Open Source *Metadata Games* System for Archives and Libraries," New England Archivists, Brown U, Providence April 2011.

Approach

After the award was announced, we gathered our team to build the backend system intended to be the core of the system while we simultaneously tested, on paper and then digitally, our game prototypes. Our commitment to open source development means ensuring that our backend (intended to be ½ the core of the system) adhere to open source licensing and practices. The frontend games were built in a range of technologies for easy testing.

With the database built, games tested and implemented, and the system installed and in place, the metadata team collected data on our pilot test. This information is available by request from our team, as we have the research paper publication with results under review.

Technical information

Technical Overview

- The Metadata Games (MG) server is written in PHP with a MySQL backend.
- We use AMFPHP to bridge to the Flash games. (we have investigated Red5 for further integration; currently using Adobe's Stratus/Cirrus for P2P connection)
- There are various user and admin pages designed for basic website interaction.
- The admin pages include tools for user and database administration, as well as report generation.

Code Libraries and Components Used by the MG Server

- The core server, originally written by Joshua Weinberg and others, and is mostly in PHP and Java.
- AMFPHPmfphp, an RPC toolkit for PHP that we use to hook PHP <-> Flash (and thus use as a conduit from MySQL <-> Flash).
- FancyUpload, a JavaScript + ActionScript + actionscript file uploader
- Services_JSON, a JSON library
- MooTools, used for file uploading
- PorterStemmer, an implementation of the Porter Stemmer algorithm in PHP.
- SWFMacMouseWheel, Mac Mouse Wheel functionality in Flash.
- SWFObject, Flash Player detection and embedding.
- Yahoo! User Interface Library, we use select pieces of this set of libs for Flash and web integration
- Some flashplayer-detection libraries from Adobe (Note that these are deprecated).
- Tweening classes (choice TBD). Looks like we're leaning towards the Actuate Tweening Library.
- as3toolkit, libs used in Alpha Guess
- DateSelector, some PHP code for HTML forms

List of Features

The Metadata Games System consists of three parts:

- A Front End, typically games, where players submit tags, see scores, and register accounts
- A Database, where tags and user data are collected and stored
- A Backend reporting area, where tags are viewed, sorted, and analyzed

Front End

- A suite of game front ends. Two of the games, Speedtag and Guess What, were designed to be two- player flash games.
- Player Registration
- Score Reporting, for individuals and groups

Database

- Hooks for html and/or flash-based games to tagging database
- User accounts with score and other stats aggregated from all games (total #games, total #turns, average tags/turn, etc.)
- Saves player data such as scores as well as tags

Backend

- A database backend with tags aggregated from all games
- Ability to view and aggregate player and image tag data
- Sorts by image, player, game
- User management area, where we can monitor what players input
- Image data upload area; imports image sets for tagging, with possible URL upload as well.
- Ability to choose image sets and select games to use for tagging at particular locales/installations
- <http://www.metadatagames.com/mg/aboutus/>

We purchased three domain names, metadatagames.com, .net, and .org.

The system is mirrored at an independent server and a Dartmouth server space.

The Games

The games were designed to elicit numerous tags from each player. Each game uses either a single player mode or a multiplayer mode. Each game records the input of a player, and the system aggregates player input tags in the backend.



Ranging from simple text input games that reward points for matching others' entries, to two player games in which players help each other find or identify images, the design of each of the games had to take into account both the need to match words to other players in order to verify them, yet also conversely allow for new or more unusual words to enter the system to provide deeper, more detailed information.

Our Study

The test case for Metadata Games image library was the Rauner Library's recently digitized Stefansson collection. For our study, we set up two duplicate installations and assigned them to two separate domains for experimental comparative testing. We used one consistent set of nearly 200 images for the pilot test (though the system can handle thousands without a problem). The goal of the study was to learn more about how people tag images, whether they could be useful, and how to improve the quality of tags. Our team completed the pilot test in the Spring of 2011 and found significant gains in accurate metadata acquisition. Again, more details on the study will be included in the published paper.

As the funding period winds to a close, we are in the process of studying the strengths of each game approach and their designs and the benefits of creating single player vs. multiplayer games. These nuances have helped our team steer the project towards building more complex, experimental single and multiplayer games.

Findings and Recommended Best Practices

During the course of our work we discovered some interesting themes in the iterative software development process. First, since different kinds of games appeal to different

players, we can achieve drastically better participation with a suite of games. Second, different game designs themselves can dramatically change the type of metadata we are able to gather. Third, content areas are prime motivators, so finding ways in which players may choose categories while not necessarily including these categories in the metadata itself is an interesting challenge when looking at the system design. Finally, we discovered methods of verifying contents using a game rather than expert review or mere crowd verification (i.e., the case of specialized word choices, only experts may know the details, scientific names, etc.) when repeated use of specialty words is limited.

After altering our approach with these in-process discoveries, we decided to offer a suite of games rather than one core game as the data gathering front end. The focus on the kinds of games and their readily apparent strengths and weaknesses when functioning has become a primary focus for us, and therefore, before launching large assessment initiatives, we have pushed back the large scale testing scheme, for we better understand our approach with these in-processes discoveries, we decided to offer a suite of games rather than one core game as the data gathering front end. The focus on the kinds of games and their readily apparent strengths and weaknesses when functioning have become a primary focus for us, and therefore we have pushed back the large scale testing scheme, for we understand better before launching large assessment initiatives what happens with the data.

Our team has completed the work and we are using the summer of 2011 to prepare the code for the Version 1.0 public release including three functioning games. Seven games were built in total, but these remaining games need to undergo usability and other research before release so we know they have the ability to generate quality metadata.

What we might have done differently

Finding programmers both interested in this type of work and willing to work for less than industry level funding is a major hurdle, but not one that is insurmountable for prototype-level development and proof of concept. For release-ready software, however, new funding will have to be sought.

Team

- **Designers:** Mary Flanagan, Zara Downs
- **Dartmouth Student Designers:** Linden Vongsathorn, Brendan Scully, Cole Ott
- **Dartmouth Student Game Testers:** Alicia Driscoll, Max Seidman
- **Content Specialist:** Peter Carini, College Archivist, Rauner Library
- **Programming:** Joshua Weinberg, Robinson Tryon
- **General Support and Project Coordination:** Sukdith Punjasthitkul
- **Game Programming:** Catty Gory, Cecile Williams and Charlie Whitney; Zen Tag, Robinson Tryon and Joshua Weinberg; Zen Pond, Robinson Tryon; Guess What? and What's That?, Cecile Williams

Advisory Board:

Brian Brantner – Computer Scientist at Adobe Systems

Dr. Drew Davidson – Entertainment Technology Center Program Director, Pittsburgh, Carnegie Mellon University

Tracy Fullerton—Associate Professor and Chair, USC School of Cinematic Arts, Interactive Media Division; Director, Electronic Arts Game Innovation Lab; and EA Endowed Chair in Interactive Entertainment

Dr. Celia Pearce—Director, Experimental Game Lab, School of Literature, Communication & Culture, Georgia Institute of Technology

The Future

Our team has begun to set our future sights on building games that rely on social reputation and status as tagging motivators, including games for social network systems such as Facebook, as well as popular media outlets. Our advisory board has been tremendously helpful in our process and we shall continue to call upon their help throughout the future of this project.

We are making partnerships with other organizations and are eager to find funding for further versions of the work. We plan to publish the results of the pilot tests in 2011/2012.

Additional Support

Additional support for the project was found through an American Council of Learned Societies Digital Innovations fellowship.